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ABSTRACT

A 3-day meeting of the Southern Region Research Conference in Agricultural Education was held in July 1972 for 22 participants to study the research implications for performance-based teacher education. The following presentations were made: (1) "Performance-Based Teacher Education in Perspective" by O.L. Snowden, (2) "Utilizing Agricultural Industry in Determining Performance Objectives" by S.D. Patterson, (3) "Career Development Programs for Agricultural Occupations" by F.J. Lark, (4) "Developing a System for Assessing Student Performance in Agricultural Education" by G.C. Shinn, (5) "Implications of a Core Curriculum for Agriculture on Performance-Based Teacher Education" by R.G. Shoemaker, (6) "Agricultural Mechanization Competencies Needed by Farmers with Implications for Program Planning" by C.M. Curtis, (7) "Young Farmer Program Research in Texas" by E.S. Webb, (8) "Agri-Business Research in Texas" by L. Lorenz, (9) "Implementing Performance-Based Teacher Education Programs" by W.F. Jackson, (10) "Relationship of Variables to Supervision of Students" by C. Byers, and (11) "Proposal for Teacher Demand and Supply in the Southeastern Region" by D. Craig. A program outline and a list of conference participants are appended. (AG)

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RESEARCH CONFERENCE

IN

AGRICULTURAL EDUCATION

PROCEEDINGS



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Theme
RESEARCH IMPLICATIONS FOR
PERFORMANCE-BASED TEACHER
EDUCATION

July, 1972

CONTENTS

<u>PRESENTATIONS</u>	Page
"Performance-Based Teacher Education in Prospective" O. L. Snowden	1
"Utilizing Agricultural Industry in Determining Performance Objectives" S. D. Patterson	7
"Career Development Programs for Agricultural Occupations" Floyd J. Lark	27
"Developing a System for Assessing Student Performance in Agricultural Education" Glenn C. Shinn	29
"Implications of a Core Curriculum for Agriculture on Performance-Based Teacher Education" R. Glenn Shoemake	39
"Agricultural Mechanization Competencies Needed by Farmers with Implications for Program Planning" C. M. Curtis	59
"Young Farmer Program Research in Texas" Earl S. Webb	69
"Agri-Business Research in Texas" Larry Lorenz	79
"Implementing Performance-Based Teacher Education Programs" Willie F. Jackson	85
"Relationship of Variables to Supervision of Students" Charles Byers	93
"Proposal for Teacher Demand and Supply in the Southeastern Region" David Craig	97
 <u>APPENDICES</u>	
A. Program	105
B. Conference Participants	109

PERFORMANCE-BASED TEACHER EDUCATION IN PROSPECTIVE

Obed L. Snowden*

Before I discuss performance-based teacher education in prospective, I would like to discuss the subject retrospectively. In the late 1950's I was a member of the Southern Regional Research Committee. One of the prime concerns of this committee was to design a research project that would gather and evaluate information which would be valid for use in the revision of present programs for training teachers of vocational agriculture. To get the "show on the road," a special committee was appointed to develop a design for research that would do the job. The committee members were Price, Oklahoma, Chairman; Scarborough, North Carolina; Knebel, Texas; Davis, South Carolina; O'Kelley, Georgia; and Snowden, Mississippi.

The committee had its first meeting during the 1958 Southern Regional Research Conference held at the University of Tennessee, Knoxville. Everything went well at this meeting. We listed what was believed to be some sound assumptions; we developed a statement of the problem; we delimited the study; we developed a frame of reference-- we did all the fine things a research committee is supposed to do -- then we went home.

At the 1959 meeting of the Southern Regional Conference held at the University of Georgia, the Special Committee for Research in Teacher Education had a meeting to prepare a progress report to present to the

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the conference. By this time, we had given our project the title, "A Study of Curriculums in Agricultural Education As A Basis for the Revision of Present Programs for Training Teachers of Vocational Agriculture." Then it happened. One of the committee members made the statement that he did not believe that it was necessary for the vocational agriculture teacher to be knowledgeable of and skilled in things of a technical nature. This member held to the belief that the primary function of the teacher of agriculture is to teach students -- two days later, after the terms of performance-based, areas of competency, field tested, et cetera had been injected into the discussion, the committee was hopelessly "hung up" -- Bob Price, after reading a few verses from the Bible, resigned as chairman of the committee -- this was at the last session of the conference -- we went home. To my knowledge, no conference-wide special attention has been given to conducting research for the purpose of designing performance-based teacher education during all the years since 1959.

The performance-based (competency-based) concept of teacher education is not a new concept by any means. But, like so many educational concepts, its time has arrived. Perhaps the emergence of an apparent dissatisfaction with present educational practices in the preparation of teachers of vocational agriculture has hastened the interest in redesigning the curriculum in teacher education for agriculture to provide for more competency-based activities. Many teacher educators, as well as others charged with the preparation of teachers of agriculture, have given much thought to this concept.

The ultimate objective of teacher education programs is to develop teachers with adequate competencies to cope with the contemporary problems of agriculture and of the people who work in it. This involves sound program planning, coordination of effort, and aggressive implementation.

The first step in projecting a competency-based teacher education program for agriculture is to identify areas of competencies needed by teachers of agriculture. We need to develop valid techniques for measuring the extent to which our present teacher education program is developing these competencies. It is believed that an acceptable way to define, or identify the areas of competency is to develop them around the three major roles of the teacher; namely, professional, technical, and social, or personal. A list of "Areas of Competency" in each of the three roles of the teacher should be developed and tested through the use of a carefully selected panel of competent individuals.

We cannot overlook the fact that competency in a teacher's subject-matter field is a part of and dependent upon competency in other areas. These areas are: (1) psychology of learning, (2) general education, (3) community leadership, and the like.

It is further recognized that performance-based decision making processes, as well as performance-based technical subject matter activities, are important in teacher preparation. For example, we in teacher education should be just as concerned about the teacher's ability to help people make managerial decisions as we are in developing technical skills. More specifically, this would mean that the vo-ag

teacher should be just as competent in working with a potential broiler producer in making the decision as to whether to enter upon a contract for producing broilers as he is competent in demonstrating know-how after he is under contract -- maybe more so, because the vo-ag teachers do not usually work with the technical phases of broiler production under contract.

The pattern which could be used in setting up competencies to be developed by teachers of agriculture might be somewhat as follows: First, a reasonably specific statement or definition of competencies expected in a specific subject-matter field should be made. A similar statement should then be made relative to competency areas decided upon, such as marketing, mechanization, et cetera.

Following the statement or definition of key competencies in his subject-matter field, the prospective teacher of agriculture should have in his undergraduate program planned performance-based activities to help him develop to the highest possible level, his abilities in these areas.

Those in charge of preparing teachers of agriculture should be aware that competency does not result from the possession of great quantities of knowledge. That is, the mere possession of knowledge is not a guarantee that such knowledge will be functionally operative at the appropriate time.

We should view competency as patterned behavior -- a pattern of general action which tends by-and-large to repeat itself as similar situations arise.

Habits are important to a teacher, but do not alone constitute competency. Habits must be incorporated into the pattern of behavior. Knowledge is important to a teacher, but not until it is integrated into the pattern of behavior and begins to serve a useful purpose. Likewise, principles and theories are important when they become an articulate part of the behavioral pattern.

A design for performance-based teacher-education activities could very well cluster around the development of competencies as (1) a person, (2) a teacher, and (3) a subject-matter specialist.

In prospective it is envisioned that a competency-based teacher education program can be developed for training teachers to teach agribusiness, natural resources, and environmental occupations. It means that a teacher is trained primarily on the site where the action is. For example, if the competency desired is in the area of agricultural mechanics, the performance would need to be where problems in mechanics exist and are being solved. If the competency desired is in the area of student motivation, the performance would need to be where there are individuals who need motivating and are being motivated, and so on. In the true performance-based activities for achieving competency, time is not of prime concern, but student progress is.

The performance-based teacher education program should serve as a focal point for the interaction of the University, the local educational agency, and the State Department of Education, in specifying those teaching competencies needed to create and sustain innovative practices

which prove effective. The performance-based teacher education program is not intended to promote piecemeal innovations, but rather to establish a systematic innovating process which correlates teacher education with the introduction of relevant curriculums and education practices.

UTILIZING THE AGRICULTURAL INDUSTRY
IN DETERMINING PERFORMANCE OBJECTIVES FOR TEACHER EDUCATION

S. Douglas Patterson*

Performance-based teacher education, under the present concept, is a relatively new term. Although a few attempts at utilizing some of the concepts of performance-based teacher education for course development and curricula improvement were reported before the mid-1950's, there appeared to be no widespread adoption of the ideas. The book Teacher Education in Agriculture was recently authored by several prominent teacher educators.¹ This thorough study of agriculture teacher education was published only five years ago, yet its authors do not refer to performance-based teacher education as a major contributor to program development in teacher education in agriculture. Therefore, before we in teacher education are stampeded into waving a magic wand and transforming our total teacher education program into performance-based components, we must examine our understanding of the concept and decide whether or not we are prepared to utilize this approach to program development.

As we consider reorganizing our teacher education programs on the basis of performance objectives, we are challenged to examine the legitimacy of these objectives on the basis of program intent. Merely transforming existing courses and associated learning activities into a performance-based program will not automatically increase the validity

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of what is being taught. In fact, such action may result only in our doing the wrong things more effectively.

A transformation to a performance-based teacher education program not only brings more responsibility for validating the process and products of the program, but also provides a logical and direct vehicle for such validation.

As long as we are vague and indecisive in our purpose and objectives and ambiguous in our evaluation, we are less susceptible to challenges to the legitimacy of our programs. You can't hit it if you can't see it. But when we begin establishing performance objectives, we imply that we know what we are attempting to accomplish. This leaves us very vulnerable to comparison with what we ought to be attempting to accomplish.

The elements that we select for our performance objectives must reflect our program intent. A cursory review of the present attempts at performance-based teacher education programs reveals at least three general methods of identifying performance objectives. These methods are:

1. A group of "experts" generates the objectives intuitively, based on past experience, knowledge and values.
2. Teacher educators analyze the elements of existing teacher education programs.
3. A type of product evaluation is conducted to determine the essential characteristics of the student.

In selecting the method of generating performance objectives, we must not neglect the basic principles that have proven in the past to be sound and effective bases for planning curriculum and implementing vocational education. One of these basic principles, which has long

been accepted as a foundation for vocational program development, is stated by Lowell Burkett as follows:

Programs of vocational education must be an integral part of the community in which they exist and must reflect the day-to-day occupational life of that community.²

Elements for performance-based teacher education programs must be derived from the community which the teacher education program is designed to serve. The only scientific procedure for deriving these elements is a study of the community. To delimit our task, we are to study the product (teachers) that we produce for the community and their interaction with that community.

A decision to study the community presents several other questions. Which community or which part of the community is to be studied? What elements are to be studied? What method of study is to be utilized?

Let's consider first, which part of the community is to be studied. As in the case with any production program in a free enterprise system, the ultimate consumer eventually determines the quality and quantity of products utilized by the society. Thus, in vocational education, we must examine the desires and needs of the ultimate consumer before designing our product. This is true even though our primary responsibility is the production of the intermediate product. In our case, the ultimate consumer is the employer of students completing vocational agriculture programs. Only by utilizing the ultimate consumer can we identify the essential characteristics of the occupations for which these students are being prepared. We must then identify the competencies and attitudes required of the employees. This in turn can

reveal the essentials of the student preparation programs. Further analysis will be necessary to reveal the appropriate teacher education program. Even the completion of these studies should not result in a set program, because the needs and desires of the consumer change. Therefore, continuous evaluation is necessary.

But, it has been pointed out by Bender,

Although there may be continuous evaluation of program, the true worth of the program cannot be obtained until it is judged against definite criteria or objectives. In critically evaluating a program, the objectives may be changed or altered to meet the expanded or changed purposes.³

Other writers have indicated that evaluation is an essential aspect of objective selection. Evaluation of what and who should be taught involves both systematic research and value judgments.⁴

One value judgment concerns deciding what characteristics of our product to study. It has been stated that the success of teachers in vocational agriculture has been due in part to their ability to keep abreast technically and pedagogically with the changing times.⁵

Pedagogy and technical competencies is a commonly used dichotomy of the educator's activities.

The pedagogical competencies are being studied by several investigators. The Center for Vocational and Technical Education at The Ohio State University has been studying those competencies associated with various teacher education programs for vocational teachers.⁶

In the Ohio study of performance requirements of teachers, the methodology of the study included an occupational analysis of pedagogical functions of teachers. The tasks or basic competencies to be identified

through introspection, and interview occupational analysis techniques were called performance elements. A performance element was defined as the smallest meaningful entity of activity into which the pedagogical duties of a teacher may be divided.⁷

The criteria for identifying a performance element were:

1. The element as a unit of instruction in teacher education is of such size that it requires an amount of time appropriate for an adult learner at the college level.
2. The element consists of content which may be divided into steps or sub-topics that are organizable and teachable.
3. The element occurs frequently in the teaching occupation.
4. The element would make a distinct unit of instruction for a teacher education class.
5. The element is an entity in itself, but has greater meaning and utility in combination with other elements.
6. The element would be easily recognizable by a majority of members of the profession as an essential teaching skill or competency.

In the Ohio study over 200 performance elements were identified. A task force of state supervisors, teacher educators and master teachers assisted in selecting the elements most important to teachers. A critical incident study involving 750 vocational teachers was also utilized in refining the list of objectives.

The conclusions of the first phase of the Ohio study indicated:⁸

1. Most pedagogical performance requirements for teachers were common to all vocational services.
2. Meaningful specific objectives could not be developed without consideration for particular institutional settings.

Initial recommendations in this Ohio Model Curricula Project were:

1. Recommendation that core offerings be considered for a majority of the curricula to be developed, providing that

such offerings were not precluded by teaching strategies, time of offering and other variables.

2. Recommendation that performance-oriented objectives be prepared as guidelines for writing specific objectives.

It is the contention of this writer that specific subject matter content is so varied among vocational programs as to preclude core offerings of many of the identified performance elements. The peculiar characteristic of the subject matter may be as critical as institutional setting developing specific behavioral objectives. Further study is certainly warranted in this aspect of assigning elements to core offerings. However, this is probably a legitimate approach to identifying pedagogical elements for teacher education.

Identifying technical performance elements is another problem. Notwithstanding the often-purported projections that within ten years one half of the workers will be employed in jobs which do not exist today, it is necessary to examine the current occupations to identify basic areas of competencies which now exist and which will be essential for success in future occupations.

The need for technical competencies has been pointed out by many writers and researchers.⁹ Various attempts at providing teachers with technical competencies have been reported.

In an effort to improve the occupational competency of vocational and technical teachers, some programs have incorporated a structured work experience, while others relied on the observation of businesses and industry personnel. Also industrial personnel have been used to teach classes and to recommend curricula development innovation. The

purpose of each program was to develop technical competencies within the teachers so that they would be able to teach the same competencies to students in their programs.¹⁰

The problem remains--how do we identify those competencies which will still be applicable in future occupations. We will examine one possible solution to this problem later in this paper. Let us consider the approach for identifying occupational requirements.

There are four basic approaches that have been utilized in identifying occupational requirements. These have been defined as:

1. The mental testing approach.
2. The job analysis approach.
3. The work sample approach.
4. The situational assessment approach.

Each of these methods was originally developed for different segments of our society and for different interests and objectives.¹¹

The mental testing movement was initiated by the practical work of Benet and some of the theoretical work of Carl Spearman. The work, which was initially for the purpose of measuring intellectual ability, was soon adapted to measure several different types of human ability including the ability to work. This method has low predictive validity because of several weaknesses in its application to the work situation.

The second major approach to vocational appraisal is job analysis. The mental testing movement was primarily a product of the university-based psychologists and educators. The job analysis approach developed within the industry itself because of the needs of certain governmental

departments. As its name implies, job analysis focuses on the description of the work to be performed, not on the characteristics of the worker.

Several approaches to job analysis have been developed. One approach utilizes the critical incident technique.

Critical incident technique consists of obtaining a description of specific acts which seem to make a particular kind of behavior effective or ineffective. John C. Flanagan and associates in the American Institute for Research studied this technique in depth.

This technique, which has been used extensively in personnel selection and prediction, appears to have important possibilities in the educational movement. Its significance lies chiefly in providing empirically derived classifications of behavior which can then be used either as a framework for subsequent measurement or as the material out of which evaluation instruments can be developed.¹²

Another approach to job analysis utilizes an employee interview. The employee is asked to identify skills and knowledges which are essential to the success in the particular occupation.

A third type of job analysis is the employer interview. In this approach the employer or his representative is asked to identify the essential characteristics of employees for particular jobs. Care must be taken in selection of the person to be interviewed. Studies have found significant differences between the concepts of the line foreman and the front office manager concerning the specific tasks of certain employees.

A third general approach to work evaluation constitutes an effort to capitalize on the virtues of both the psychometric testing and job analysis approaches, while trying to avoid the limitations of both. This third method is the work sample approach. The concept that the most realistic way to evaluate behavior is to observe people at work initiated the development of the work sample approach.

Work sampling method was first used by L.H.C. Tippett, a British statistician, in 1935. It was first used in the United States by Robert Lee Morrow in 1940. The term work sampling was first used by L. C. Brisley in 1952.¹³

Work sampling is a measurement technique for quantitative analysis, in terms of time, of the activity of men, machines, or of any observable state or condition of operation. Work sampling provides opportunity to draw inferences and establish frames of reference from a random sample of the whole.¹⁴

Many recent efforts have been made to utilize the work sample method in designing vocational educational programs. The procedure is to utilize the essential elements of the occupation as identified in work sampling and develop evaluation units called work samples.

As a result of some twenty years of trial and error experimentation with a variety of practical, structured trade and job tasks, the Institute for the Crippled and Disabled published the well-known TOWER system of vocational evaluation in 1957. The TOWER system has recently been revised and the current version contains over 110 work samples which are included within the following fourteen broad occupational families: Clerical, Drafting, Drawing, Electronics Assembly, Jewelry Manufacturing, Leathergoods, Lettering, Machine Shop, Mail Clerk,

Optical Mechanics, Pantograph Engraving, Sewing Machine Operating, Welding and Workshop Assembly.¹⁵

Within each job family, these work samples are designed to teach the evaluatee the basic essentials of a particular broad industrial operation and to confront him with structured tasks related to that operation. The tasks are arranged in a level of increasing difficulty and essentially require the application of knowledge gained from one task for successful performance of the next task, which is at a higher level of difficulty. The individual's performance on each task is graded on the basis of established quality and quantity standards.

According to J. M. Nadolsky, work sampling,

. . . is a global relationship approach to vocational assessment which emphasizes the individual-in-relation as the unit of analysis and assessment. Furthermore, it is an existential approach toward vocational evaluation, where the concern is not with the individual or with the environment as such, but rather with the relationship of individual-to-environment.¹⁶

But even this approach has several shortcomings. Rosenberg indicated that TOWER system scores were generally not as good as ratings by training instructors for predicting vocational success. He also noted that correlation co-efficients between TOWER scores and vocational instructor ratings rarely exceeded .19.¹⁷

A more recently developed approach to studying occupations has been referred to as the "situational analysis approach." It is similar to the work sample approach in that it is based on the effort to simulate actual working conditions. The difference between the two approaches lies in what is being simulated. The work sample approach is oriented toward assessment of concrete skills, while the situational

approach is oriented toward work behavior in general. The situational approach asks a prior set of questions. Can the potential worker work at all? Can he conform to customary work roles? Can he take supervision? Can he get along with his co-workers? Can he put in an ordinary day's work? How does he respond to demands to increase his productivity or to improve his quality? Does he work better alone or in the presence of others? Under what kind of supervision does he work most effectively? Does he get so pre-occupied with quality that he cannot produce at acceptable rates? Or does he try to work so fast that his quality suffers? What are his strengths or weaknesses as a worker?

The choice of the approach to work evaluation should depend upon the objectives of the evaluation. If what we need is a mass screening device that can enable us to select for certain kinds of employment those persons who possess the necessary minimum of certain abilities, then certain of the psychometric tests may serve reasonably well. If we need to know what it is that a worker must do on a given job, then some form of job analysis may be required. If we want to assess an individual's ability to master a particular skill, then it is likely that we can do best through the use of the structured work sample. If we wish to know whether a given person can work at all and what it is that causes him to work very poorly, it would seem that the simulated work situation would give us the best solution. However, only the job analysis approach and the work sample approach lend themselves readily to translation into performance objectives.

A major question confronting teacher educators is, "How do we discover what the consumer of my product will need in the future?"
Florida Project Agriculture¹⁸ was designed to serve as a model of one approach to answering this question. One intent of the project was to develop a model for utilizing the resources of industry in ascertaining the objectives of teacher education programs.

Florida Project Agriculture is a study of the educational needs and occupational opportunities in Florida's agricultural industry. The objectives of the project are to:

1. Identify the number and types of occupational opportunities in the agricultural industry.
2. Identify the skills and attitudes, understandings and other abilities needed by agricultural employees.
3. Develop guidelines for designing educational programs that would develop these competencies in present and potential agricultural employees.
4. Prepare agricultural educators to utilize occupational information in curricula development and implementation.
5. Develop guidelines that can be used in coordinating agricultural education programs among the various institutions.
6. Develop a system for monitoring and forecasting employment needs in agriculture.

This project has been planned to include five major phases. The first phase will be an analysis of the manpower demands in Florida's agricultural industry. A second phase will be an agricultural industry projection phase which provides long-range forecasting over the various agricultural industries. Job analysis studies will constitute the primary function of the third phase. The fourth phase will be the curricula improvement phase in which data will be analyzed and organized

for use by administrators in managing agricultural education programs. A fifth phase will be the initiation and continuous maintenance of an agricultural occupations monitoring system. The monitoring system will collect and analyze manpower demand data and interface the analyses with results from manpower supply data obtained from agricultural education programs.

Florida Project Agriculture was designed to utilize a two-pronged system of data collection and analysis. Task Forces were organized to study specific segments of the agricultural industry on a state-wide basis and County Study Committees were organized to study the agricultural industry within each county.

For the purpose of organizing the Task Forces, the state agricultural industry was divided into 19 specific segments. The Task Forces were organized through the State Agricultural Education Advisory Committee which served as the Advisory Committee for Florida Project Agriculture. The Advisory Committee was a composite of 11 sub-committees. Each sub-committee of the State Advisory Committee analyzed its segment of the industry and appointed appropriate Task Forces to study its area of responsibility. In situations where the educational requirements within a specific segment of the agricultural industry varied greatly, the sub-committee organized more than one Task Force to study that segment of the industry. A total of 19 different Task Forces were identified.

The purpose of the Task Forces was to analyze the specific segments of the industry, to determine the present structure of employment, and

to project future manpower needs for the industry. The specific tasks were:

1. Identify and label job titles for a segment of the industry.
2. Develop generalized job descriptions for each job title.
3. Assist in clustering job titles on an educational requirement basis.
4. Identify the hiring patterns of the industry.
5. Project major changes in employment patterns which will affect employment opportunities.
6. Assist in informing the agricultural industry of the scope and objectives of agricultural education programs.
7. Assist in translating industry needs into educational programs through occupational analysis studies.

Each Task Force operated independently in accomplishing its objectives. Task Force chairmen reported to the Advisory Committee and coordinated their efforts with the project staff.

The job titles identified by the various Task Forces were analyzed by the project staff. The list of job titles was refined and adapted for the interview instruments that were used by the agricultural educators in interviewing various agri-businesses.

County Study Committees consisting of agricultural educators and agri-businessmen were given the job of identifying the population of agricultural employers within each county and interviewing a random sample of agricultural employers. Agricultural educators on the County Study Committees were given training and materials to collect data regarding the scope of agricultural employment and anticipated employment needs. Agricultural educators were also responsible for utilizing the analysis of the study in revising and updating local agricultural curricula.

Data collected from individual employers within each county were to be summarized for each segment of the agricultural industry. Each Task Force would then analyze the data for its segment of the industry. The data would be compared to the job description data that was developed by the Task Force.

Occupations would then be clustered on the basis of common performance requirements. Key occupations would be identified in each occupational cluster. Key occupations in each cluster would be identified as those occupations whose performance requirements would remain rather stable for the next few years. This identification would be accomplished by each Task Force utilizing a Delphi Projection Technique. The projection technique would focus on major changes in the industry which would affect changes in employment patterns.

An occupational analysis would then be performed on each key occupation. The analysis would identify the essential characteristics of the cluster of occupations. These characteristics would be identified in terms of performance requirements.

A model for assessing occupations has been developed by Glen Shinn at the University of Florida.¹⁹ The model was developed as an assessment program for ornamental horticulture nursery workers.

The performance objectives identified for the occupational clusters will be utilized in designing vocational education programs. The performance objectives will also serve as an assessment program for students in vocational education.

The next step will be to identify the teacher competencies associated with successful student performance on the assessment program.

Here a combination of work evaluation approaches will be necessary. Because of the limitations of each approach, no single approach will provide sufficient bases for adequate teacher education programs.

A selected technique of the job analysis approach or the work sample approach may adequately identify the necessary technical competencies as well as the pedagogical skills for the successful teaching role. But experience has taught us that something more than possession of skills or competencies is essential to the teaching process. Some form of the situational approach to work evaluation may provide the key to the successful organization and implementation of our performance-based teacher education programs.

In summary one may say that the process of developing a performance-based teacher education program is no one-step, simple endeavor, but requires many prerequisite processes. We have many alternative approaches to identifying legitimate performance elements. The approach we select should be determined by the purpose of the program. The base data for our performance program must come from the ultimate consumer. Florida Project Agriculture provides a model of obtaining the base data.

Finally, performance elements can provide the teacher education program with clear direction and purpose so that both the educator and the student know what they are doing and why.

FOOTNOTES

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DEVELOPMENT AND TESTING OF SELECTED CURRICULUM UNITS
FOR AGRICULTURAL CAREER AWARENESS IN OKLAHOMA

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The purpose of this study was to develop and pilot test selected curriculum units as a basis for developing more curriculum which can be used by teachers of vocational agriculture in helping students to become aware of the occupations which are available and developing in agriculture.

This study included the ninth grade students in twelve departments of vocational agriculture in Oklahoma. First, representative occupations from the broad field of agriculture were selected using the counsel of authorities from each field and demand data for agricultural production, agricultural sales and services, agricultural mechanics, agricultural products, ornamental horticulture, natural resources, and forestry. A curriculum unit and video tape were developed for each of the following occupations: (1) farm management (operator), (2) agricultural sales clerk, (3) agricultural mechanic, (4) meat cutter, (5) nurseryman, and (6) forestry technician. Each of these units were taught in an experimental school where a pre-test and post-test were given to the students. Also, control schools were used only where the pre- and post-tests were given. In addition to a unit on a specific agricultural occupation, each teacher taught a unit developed on self-discovery. The same schools were used as experimental and control groups.

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The gain in scores made by the students was significant at the .05 level for each unit tested. It was found that the scores of the students did rise significantly on each of the units taught in the experimental schools as compared to the control schools.

It was concluded that more of these specific occupational units should be developed and that the project be continued on a broader base. It was also concluded by the teachers that the video tapes aided in the students getting a realistic perception of the occupation being studied.

DEVELOPING A SYSTEM FOR ASSESSING
STUDENT PERFORMANCE IN AGRICULTURAL EDUCATION

Glen C. Shinn*

Assessment and accountability are two terms which have certainly received increased attention throughout our educational system--and promise to continue to make things interesting. Even though both terms have been around for some time, both may need to be redefined in light of their new meanings.

Accountability in the Florida system of public education has been defined as the process of explaining the utilization of resources in terms of their contributions to the attainment of "desired" results. The concept does require that the use of resources be explained. It does not require that any pre-specified results shall be achieved. Accountability merely assures the availability of relevant information which can be used in making decisions regarding the critical allocation of resources. This concept does not justify ex post facto criticism when certain results have not been achieved unless it was understood in advance that such results should be expected (Anonymous, 1971). Accountability exists in all stratum of education from basic teacher-parent to commissioner-legislature relationships.

Assessment on the other hand is the accurate evaluation of the capabilities and limitations of the student. It provides the base-line data for the decision-making process. In the past, measurement was principally norm-referenced, based on the proportion of students in a

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normal distribution. An expanded emphasis of accountability has accentuated the role of criterion-referenced assessment in making critical decisions. Ward (1970) described criterion-referenced assessment as concerned with the individual's ability to perform at tasks representative of some explicit criterion. "The issue is, therefore, whether the subject has or has not mastered the criterion behaviour [sic]; whether his standards are better or worse than those of others may be largely immaterial."

There are many tasks which are required upon entry-level employment and which must be performed at a specified level of competency. It may fall our lot to describe the appropriate tasks and criterion for agricultural workers.

A Stimulus for Change

Because of a partial credibility gap and the "bigness" of education, many state legislatures are demanding product assessment and accountability in our educational systems. For many years, our schools have been time oriented--they were required to hold classes 180 days per year and little else except a hardware evaluation was involved in the criteria for quality instruction. In 1968, the Florida legislature enacted a statute (Section 229.551) which charged the Commissioner of Education to "...expand the Department of Education in planning the state's strategy for effecting constructive educational change and providing and coordinating creative services necessary to achieve greater quality in education." Subsequently, the Educational Accountability Act of 1971 (House Bill 894) affirmed and clarified the responsibilities of the Commissioner and the local school districts to

report on the effectiveness of public education in Florida. This bill had five major purposes:

1. To provide for implementation and further development of education assessment procedures.
2. To provide for the establishment of educational accountability in the public school system of Florida.
3. To assure that education programs operated in the public schools of Florida lead to the attainment of established objectives for education.
4. To provide information for accurate analysis of the costs associated with public education programs.
5. To provide information for analysis of differential effectiveness of instructional programs.

Commissioner Floyd T. Christian, in his remarks on March 24, 1971, to the subcommittee of the House Committee on Appropriations, made the following statement: "I have established as one of the major objectives of the Department of Education 'increasing the productivity of all public education programs.' In doing this, we plan to shift from a 'time oriented' to a 'performance oriented' public school system."

Early in 1971, the Florida Educational Research and Development Program funded a series of 19 projects designed to facilitate and expedite implementation of the Educational Accountability Act of 1971. With the cooperation of the Division of Vocational Education, three assessment projects were undertaken in the area of vocational education. They included Horticulture (University of Florida), Typing Skills (University of Florida), and Employability Skills (Florida A&M University).

The Hatch Act thrust us into an era of criterion-referenced evaluation of agricultural products. The dairy herd sire had to increase the milk production of his daughters or he was replaced. A parallel

thrust seems to be happening today for educational products.

A System for Assessment

Project Horticulture is a Florida-based applied research project charged with the development of a model which could be used in determining the competencies of nursery workers during the training program in light of the required competencies for sub-managerial entry-level employment. The format was developed by W. James Popham and others at UCLA. It essentially uses deductive reasoning in going from agriculture to nursery operations. This project was delimited to nursery operations and more specifically to the characteristics of entry-level nursery workers. During the initial stages, numerous curriculum guides were collected from state and national sources and textbooks were assembled to assist in the content development.

The project staff developed a catalog of performance objectives, some 433 in all, which is thought to represent the majority of behaviors which are expected of entry-level employees. Each of the objectives stated the conditions of the behavior and a minimum level of performance which is acceptable in the nursery business.

Two sections of the catalog, about 250 items, were submitted to 70 vocational agriculture teachers for evaluation who were involved in three summer workshops. They were asked if each competency was necessary for entry-level employment of a nursery worker and if so, to categorize the behavior into one of four groups: (1) little competency required, (2) some, (3) much, or (4) very much competency required for entry-level employment. There was very low discrimination among performance statements when teachers attempted to identify the high

priority items in the catalog. There were no significant differences in the perceptions among the "horticulture", "prevocational," and the "curriculum development" groups of teachers in their ability to identify high priority items using a Mann-Whitney U test of significant.

There was little evidence to allow the project staff to group specific competencies into priority levels. At that time it was decided to submit the catalog for evaluation by 10 nursery owners-managers. The manager group was able to discriminate among items with a range in value of 3.33 (much plus competency) to 0.00 (not required). Incidentally, the teachers ranked these same items 2.33 and 1.49 respectively!

The nursery owners-manager evaluation identified 57 items listed from the catalog as ones they expected workers to possess when they assume employment. The high priority objectives ranged in the level of cognition and psychomotor involvement but include the practical tasks which must be included in a basic instructional program.

When the nursery owner-manager and teacher groups were compared, there was a significant difference in the ordering of importance of competencies at the p.01 level of confidence using the Mann-Whitney U test. We recommend that this type of research be replicated in other instructional areas to establish more valid conclusions. Teachers who have traditionally been associated with production agriculture may not understand the needs in the other occupational areas of agribusiness. The project staff feels that these data have direct implications for future curriculum development.

Phase II, Validation and Testing

The purposes of Phase II of Project Horticulture were twofold. First, to increase our level of confidence by increasing the sample size

of nursery owners and second, to field test the identified high priority items for validity and usability within on-going instructional programs.

We were very concerned about the sample size which might be required in a study of this type. Using a comprehensive listing of certified nurseries, it was established that there were 833 operations which met our criteria. We were only interested in "ornamental" nurseries with two or more full time employees. Using a sampling formula described by Hauskin (1963) we discovered that a sample of 204 was required for a p.05 confidence level and that this number was not in the scope of our project budget. Using the listing, 21 additional nurseries were randomly selected and individually interviewed on site using a modified Q-sort technique. Using these data, it was determined that there were differences among geographic areas within the state; however, there also was a common core of skills which should be possessed by the majority of workers.

Twenty-two of the 57 original items were replaced when the sample was expanded to 31 owners and managers. Essentially, the replaced items did not decrease in mean value, rather the mean value of the 22 increased. With a sample of 31 from a population 833 nurseries we established a level of confidence of .15 in our results. There are recognizable shortcomings of such confidence level; however, in attempting to maximize our resources we feel this is the best estimate available.

We might add that of the 31 managers contacted, 30 were very enthused over the possibilities of such research and of the impact which it could have on instructional programs.

In order to field test the original items, the state supervisory staff was asked to identify the outstanding programs in the state which have offerings in ornamental horticulture (nursery operations). Twenty programs were identified and 19 accepted the responsibility to evaluate a matrix of high priority competencies. A randomized factorial design with fractional replication was selected for the evaluation. All programs were assigned the five highest ranking competencies.

The remaining behaviors were grouped into eight instructional packages and randomly assigned to each of the schools giving a 2×8^n treatment effect. Because of distinctly different programs---a junior high, special needs, and a junior college---three schools were assigned outside of the main design.

An a priori decision determined that if 50 percent of the students could successfully complete the item, we would accept it as a reliable question. When the items are administered under controlled conditions, the proportion of students successfully completing each item must be increased.

Each participating teacher was asked to evaluate each of the assigned performance objectives and accompanying assessment items on four discrete factors: (1) Clarity: Is the objective clearly stated so that everyone understands what is expected? (2) Reality: Is the criterion set at a realistic level? (3) Performance: Can you (the teacher) perform this task without practice? (4) Administration: Can this item be administered in your program without additional equipment or material?

Because of the varying levels of difficulty and the lack of uniform instructional activities, the teacher evaluation provided an interaction effect and was used to group those items which were considered for revision. After considering the confounding effects of the treatment, eight of the 57 behavioral statements were identified as needing revision as a result of the field testing efforts.

We might add that we submitted the data for analysis using a conventional iterative bidimensional item analysis program for norm-referenced measurement and found that we could not accurately evaluate each item simply using a biserial correlation coefficient. We have not developed a good method of evaluation for each of the test items but think that the MERMAC test analysis and questionnaire package may offer additional insight.

Student Guidance, Flexible and Relevant

We believe that this system of assessment offers the flexibility essential for today's educational problems. It will fit into a wide range of scheduling configurations found in our school systems and the teacher can diagnose problems and prescribe alternative strategies for each individual. Using this approach, much of the learning could be individualized. Possibly the most important skill a student can develop is the ability to make decisions concerning the quality of his own performance. Brody (1963) believes the key to efficient learning may be a set of internal standards to guide student behavior. This system of criterion-referenced assessment will provide those standards.

Conclusions

We know that our staff is biased and probably overenthusiastic with the outcomes of this project but several others are interested. The majority of the teachers who field tested the materials are excited about the product. Nursery owners and managers are eager to improve the technical competencies of entry-level workers and believe this technique provides a communication link with the training agency. Also, funds have been allocated from research and development to allow the staff to develop a consortium among interested states in an effort to cooperate in the development of similar projects. Most important, however, the student can determine his or her direction and leave a course with a listing of those behaviors he can satisfactorily perform so the employer can more effectively evaluate the applicant in light of the job requirements.

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CORE CURRICULUM FOR AGRICULTURE AND AGRIBUSINESS
ON ALL LEVELS OF EDUCATION

R. Glenn Shoemake*

First, let me give you the project staff's definition of a core curriculum. It is common knowledge and the skill areas around which all other related subject matter and/or experiences can be grouped for a particular discipline; in this case, agriculture and agribusiness.

Purposes and Objectives

The primary purpose for the study was to find common knowledge and skill areas needed by all persons engaged in or preparing to engage in agriculture or agri-related occupations. Specific objectives of the study were:

1. To determine and evaluate the individual training needs of persons who are working in, or preparing to work in agribusiness, natural resources, and environmental control occupations with reference to their socio-civic and recreational activities; and their educational and personal qualifications for successfully entering or making progress in some level of employment in agribusiness, natural resources, and environmental control occupations.
2. To determine and evaluate the skills and other competencies needed by persons preparing to enter or who have already entered some type of agribusiness, natural resources, and environmental control occupations.
3. To develop educational objectives based on the training needs, skills, and/or other competencies of persons who are working in, or preparing to work in agricultural or agri-related occupations.

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4. To develop a core curriculum based on the educational objectives derived from the training needs, skills, and/or competencies of persons working or preparing to work in agricultural and agri-related occupations.
5. To develop innovative teaching techniques and differentiated staffing patterns to successfully implement the core curriculums developed for persons planning careers in agricultural or agri-related occupations.

Research Design and Method

The first phase of the research was spent gathering data relevant to the proposed study. With the available information, an instrument to evaluate knowledge and skill areas needed by persons involved in or preparing to enter into an agricultural or agri-related occupation was developed. Groups utilized in this study were: farmers, agribusiness personnel, educational personnel (superintendents, principals, and vo-ag teachers) and secondary school students.

The instrument consisted of the following: (1) a characteristic page for each group and (2) the body consisted of the six recognized agricultural subject matter areas.

Included in the subject matter areas were two aspects of education: (1) the vocational aspect; and (2) the environmental aspect. These were to be assessed separately by each interviewee.

A map of Mississippi's economic areas was obtained and a 20 percent random stratified sample of counties within the state was chosen, along with alternate counties for each area.

After final selection of the 16 counties, lists of agribusinesses, schools, and school personnel were compiled. Several sources were used to compile a more composite list of agribusinesses which are as follows:

(1) the Mississippi Employment Security Commission; (2) the Mississippi Forestry Commission; (3) the Mid-South Farm Equipment Association; (4) the Deep-South Farm and Power Equipment Association; (5) the Mississippi Department of Agriculture and Commerce; and where possible, the chambers of commerce were utilized.

A total of 122 educational personnel, 262 agribusiness personnel, 200 farmers, and 712 students were included in the study. Personal visits were made to schools to arrange interviews with second- and third-year students of vocational agriculture and to arrange the gathering of data from farmers by the vocational agriculture teachers. These visits also were used to get the response of administrators and teachers of vocational agriculture toward the data-gathering instrument used in the study. In most instances, personal interviews were made with agribusiness personnel with the assistance of the local vocational agriculture teacher or teachers.

Analytical Design and Method

Information on the completed questionnaires was transferred to International Business Machine (IBM) code sheets, and then to IBM cards for electronic computations. Tabulations were performed on electronic computers in the Mississippi State University Computing Center.

FINDINGS

In attempting to evaluate the needs and priorities for the agribusiness, natural resources, and environmental control curriculum, several groups were utilized. These were: (1) agribusiness personnel, (2) educational personnel, (3) farmers, and (4) secondary school students.

The following characteristics were thought to be most outstanding:

Agribusiness Personnel's Characteristics

1. 63.74 percent of those surveyed received their training on the job.
2. 16.04 percent of those surveyed had vocational agriculture in high school.
3. Less than 2 percent had training in a secondary technical school.
4. Less than one percent had training in a post-secondary trade school.
5. 82 percent had farm backgrounds.
6. Only 8.4 percent had urban backgrounds.

Educational Personnel's Characteristics

1. 20.49 percent served schools with less than 600 students.
2. 33.61 percent served schools with more than 900 students.
3. 74.59 percent had farm backgrounds; 17.21 percent had rural nonfarm backgrounds; 91.80 percent had rural backgrounds.
4. 7.38 (less than 8 percent) percent had urban backgrounds.

Farmer's Characteristics

1. 25 percent had farms less than 100 acres in size.
2. 28 percent had farms more than 500 acres.
3. 34.5 percent of the farmers did not have vo-ag in high school.
4. 62.5 percent had vo-ag in high school; 10 percent had vo-ag one year; 17 percent had vo-ag 2 years; 35.5 percent had vo-ag three years or more.
5. 88.5 percent had farm backgrounds.
6. 5.5 percent had urban backgrounds.

Student's Characteristics

1. 23.17 percent had experience on a full-time farm.

2. 49.58 percent had experience on a part-time farm.
3. 5.06 percent had experience in agribusiness.

Curricular Appraisal

The division of curricular appraisal is subheaded or divided into the following sections: (1) vocational aspect of the curricula; (2) environmental aspect of the curricula, and (3) composite ratings of vocational and environmental aspects of the curricula. In evaluating the knowledge and skill areas of the instrument, the same rating scale was used for both the vocational and environmental aspects of the curricula.

Respondents were asked to rate each item on a three-point scale; a rating of one, "no use"; two, "useful"; and three, "essential."

In evaluating the curriculum, six knowledge and skill areas were used. These are referred to as modules. Each module had several items and each item was rated individually: Animal Science included 5 items; Plant Science included 7 items; Soil Science included 6 items; Agricultural Business Management included 5 items; Leadership Development included 3 items; and Agricultural Mechanics included 14 items. Overall ratings for all six knowledge and skill areas used in the survey were useful or above, but at different degrees.

Vocational Aspect of the Curriculum

Overall ratings for the vocational aspect of the six knowledge and skill areas placed the priority or commonness of each module for agriculture and agribusiness in the following order:

1. Agriculture Business Management
2. Plant Science

3. Agricultural Mechanics
4. Animal Science
5. Soil Science
6. Leadership Development

Agricultural Business Management

In ranking the modules within the curricula, the overall ratings of the agricultural business management module were highest. Items within the module receiving highest ratings were: (1) basic principles of economics; (2) budgeting; (3) marketing (buying and selling), and (4) accounting and money management. Agribusiness personnel's and students' ratings for the preceding items were lower than farmers and educational personnel ratings.

Plant Science

The overall ratings of the plant science module had a wide distribution. Farmers' ratings tended to be higher than other groups of respondents, with highly significant ratings for four of the six items within the module. Conversely, agribusiness personnel rated both identification and classification of plants, plant physiology, and reproduction slightly significant (1.51 - 2.0), while rating other items such as cultivation, harvesting, identification and control of insects, plant nutrition, and identification and causes of diseases significant (2.1 - 2.50).

Agricultural Mechanics

Of the fourteen items assessed, the following items received the highest overall ratings for the module: (1) power mechanics, (2) operating farm machinery, and (3) electricity.

Composite Ratings

Before leaving the vocational aspect of the curriculum, one other feature will be shown. A composite rating (ratings of all groups for each item added together and then averaged) was calculated.

The top ten items within the 40 appraised arranged from the highest rating downward were:

1. Accounting and money management - (a mean of 2.581) of the Agricultural Business Management Module.
2. Management - (a mean of 2.567) of the Animal Science Module.
3. Marketing (buying and selling) - (a mean of 2.561) of the Agricultural Business Management Module.
4. Power mechanics - (a mean of 2.510) of the Agricultural Mechanics Module.
5. Operating farm machinery - (a mean of 2.501) of the Agricultural Mechanics Module.
6. Budgeting - (a mean of 2.485) of the Agricultural Business Management Module.
7. Cultivation - (a mean of 2.457) of the Plant Science Module.
8. Harvesting - (a mean of 2.446) of the Plant Science Module.
9. Basic principles of economics - (a mean of 2.451) of the Agricultural Business Management Module.
10. Plant nutrition - (a mean of 2.414) of the Plant Science Module.

Environmental Aspect of the Curricula

In this division the same individuals used in the vocational aspect of the curriculum appraised the six knowledge and skill areas as they related to maintaining their environment. This type of response could be compared to practical arts and/or environmental improvement or maintenance education. The same knowledge and skills areas were evaluated. Also, the same rating scale used in presenting the data for the

vocational aspect of the curricula was used. The three modules receiving the highest ratings were: (1) agricultural business management, (2) animal science, and (3) agricultural mechanics.

The top ten items (composite ratings) in this aspect of the curriculum were:

1. Accounting and money management - (a mean of 2.406) of the Agricultural Business Management Module.
2. Budgeting - (a mean of 2.392) of the Agricultural Business Management Module.
3. Marketing (buying and selling) - (a mean of 2.379) of the Agricultural Business Management Module.
4. Management - (a mean of 2.378) of the Animal Science Module.
5. Nutrition - (a mean of 2.298) of the Animal Science Module.
6. Electricity - (a mean of 2.276) of the Agricultural Mechanics Module.
7. Painting, preserving, and finishing - (a mean of 2.268) of the Agricultural Mechanics Module.
8. Plumbing - (a mean of 2.205) of the Agricultural Mechanics Module.
9. Power mechanics - (a mean of 2.192) of the Agricultural Mechanics Module.
10. Basic principles of economics - (a mean of 2.190) of the Agricultural Business Management Module.

Appraisal of Staffing Patterns and Methodology of
Teaching for Agricultural and
Agribusiness Occupations

The next phase of the project was spent attempting to evaluate teaching methods and staffing patterns for Agricultural Education.

After consultation among staff of the Agricultural Education Department and the Research Coordinating Unit, it was believed that staffing patterns and teaching methodology and/or techniques could

best be evaluated by those persons directly associated with the educational process. This would include teachers of secondary and post-secondary agriculture programs throughout the State of Mississippi. After reviewing both general and vocationally oriented materials, it was believed that both present and innovative examples of teaching techniques and staffing patterns should be evaluated.

Also, it was believed that if the career education concept is to include agribusiness, natural resources, and environmental control education, recommendations for subject matter, staffing patterns, and teaching techniques for the research project should be made to this effect.

Upon completion of the questionnaire, 22 teachers of agriculture were asked to respond to the questionnaire. The respondents represented a wide range of experiences and expertise in the field of agricultural education. This group included both secondary and post-secondary teachers from across the State.

It must be remembered that both staffing patterns and methodology for teaching were aimed at implementing the program from grade level one through grade level fourteen.

At this point it seems appropriate to outline the stages included in the career education concept and the primary purpose for each period in the concept as we see it. First, what do we consider "career education" as being? Career Education -- a series of experiences, decisions, and interactions, which, taken cumulatively, results in the formulation of a vocational self-concept and provides the means by which that self-concept can be realized.¹

Within this concept the following periods or stages are found:

1. Awareness Period - A time element within the career education concept denoting grades K-6 of the traditional school organization. This denotes the segment of education for orienting the students to their total environment. It should serve as a time devoted to awakening the interest areas of the student, while molding wholesome attitudes and images toward himself and society.
2. Exploration Period - A time element within the career education concept denoting grades 7-8 and sometimes grade 9 of the traditional school organization. This denotes the segment of education used to explore the student's occupational interest areas, while developing certain decision-making skills.
3. Preparation Period - A time element within the career education concept denoting grades 9, 10, 11, 12 of the traditional school organization. This indicates the segment of education for developing primary competencies for both job entry and environmental maintenance, which is labeled by some proponents of career education as ". . . skills to live by."⁵ This segment is commonly divided into two parts in our realm of the concept.
 - A. Basic Preparation - A commonness of subject matter content and experiences that will relate to all areas of agribusiness, natural resources, and environmental occupations education.
 - B. Specialization - An indepth study of a particular job, and development of competencies to perform in chosen occupation.
4. Post-Secondary Period - A time element within career education denoting the post-high school period. This segment of the education concept is devoted to developing specialized and/or technical competencies, or pre-professional development in the occupation chosen by the student.

In attempting to make the career education concept work, the project staff felt that two other steps or phases should be added:

- (1) placement and (2) advancement.

In gathering responses from the teachers, items or statements were written so as to get three types of responses, either positive, neutral, or negative. The rating scale used in the questionnaire was as follows:

5-- strongly agree; 4-- agree; 3--neutral; 2-- disagree; 1-- strongly disagree.

Staffing Patterns for Agricultural and
Agribusiness Programs

In attempting to appraise a variety of staffing patterns for implementing the most workable and efficient program for agriculture, both secondary and post-secondary teachers of agriculture were used. The questionnaire was geared to the career education concept, thereby incorporating agricultural subject matter from grade one through the technical or post-secondary phases of education. Teachers were asked to rate nine items pertaining to staffing patterns. Both old and new staffing concepts were incorporated into the questionnaire.

Positive responses were grouped around three items. These items listed from highest to lowest were: (1) A curriculum council composed of specialists who develop curricular materials, tests, etc., and a master teacher who supervises the teacher instructors who are aided by non-credentialed instructional and technical assistants could effectively implement and carry out a total program of vocational education in a school system; (2) An agricultural program should have technology specialists teaching in each subject matter area taught; and (3) An agricultural teaching team with a team leader, and assistant team leader, teachers and paraprofessionals could coordinate the teaching of all agricultural subject matter, provide the supervision, and carry out all other functions of a vocational complex. The items receiving the lowest ratings were: (1) A one-teacher vo-ag department could coordinate teaching of all agricultural subject matter plus carrying

out all supervisory and other community activities effectively (a mean of 1.19) and (2) One teacher and a teacher aide who is in charge of non-instructional activities could teach all agricultural subject matter and carry out all other duties of the department effectively (a mean of 1.22).

Methods in Teaching Agricultural and
Agribusiness Knowledge and
Skilled Areas

Teachers were asked to respond to nine items pertaining to different methods in teaching agricultural subject matter. Again, implications were aimed toward the career education concept, inclusive of grades one through fourteen. Statements dealing with such things as programmed instruction, project method, land laboratories, curriculum arrangement, etc., were rated. With the career education concept in mind the teachers' ratings were high, with only one item having a mean of less than 3.0. Teachers' reactions were that most innovative types of teaching methodology could help in achieving objectives in the educational process, but at different degrees. The item receiving the highest rating (a mean of 4.78) was that arranging the curriculum in small detailed units (modules) for each level of education could make the teaching process more effective.

Opinions of the Jury of Experts Toward the
Proposed Core Curriculum for Agricultural and
Agribusiness Occupations on All Levels of Education

Once hypotheses toward priorities in subject matter areas were either proven or disproven, project personnel began outlining materials that could be included in the instructional process.

These materials were assembled in order for a reaction panel to rate their necessity for inclusion in the curriculum. Thus persons exhibiting expertise in the traditional educational process or agribusiness, natural resources, and environmental control programs, could react to subject matter to be incorporated into the agribusiness, natural resources, and environmental occupations service areas in the career education concept.

The traditional organization of the school was classified into specific grade levels using the U. S. Office of Education's model as a guide. These levels are as follows: Level I (grades K-6) - Awareness period; Level II (grades 7-8) - Career Exploration; Level III (grades 9-12) - Preparatory Period; Level IV - Post-Secondary or Technical.

Once the curriculum could be grouped into modules to form a core of subject matter for all levels of education, specific units within each module for each level of education could then be included in detail. Instead of finalizing the "arm chair research" the instrument was taken to knowledgeable persons, such as vocational directors, superintendents, principals, vo-ag teachers, and curriculum specialists. A total of 27 persons responded to the instrument. This group represented a wide range of experience. These opinions were used as a basis for validating conclusions and recommendations for agriculturally oriented subject matter to be included in the service area of agribusiness and natural resources for career education.

Again, a five-point rating scale was used. The arithmetic mean was used to show the agreement, neutrality, or disagreement of the respondents to each item. This division of the project was arranged

under four headings. These are: (1) Elementary or Career Awareness Period; (2) Junior High or Exploration Period; (3) Secondary or Preparation Period; and (4) Post-Secondary or Technical Period. This division shows the proposed curriculum for each level and the opinions of knowledgeable persons as to its inclusion into the total of career education.

Level I - Career Awareness (Grades K-6)

Under the elementary heading there were six areas included, as there were in the basic questionnaire. Only three (3) items in the proposed elementary agricultural segment of the curriculum received ratings less than a mean of 4.21. The items and modules were:

(1) tools of primitive man, elementary agricultural mechanics;
(2) what man has discovered about soil, elementary soil science; and
(3) how animals are developed, elementary animal science. The responses were that these items should be included, but to a lesser degree than other items. Modules receiving ratings of 4.21 - 5.00 were: (1) elementary economics and business; (2) elementary plant science, and
(3) elementary leadership development. Thus, the respondents strongly agreed that the proposed material should be used as a guide for developing both subject matter content and practical experiences to make younger children aware of their total environment, including agriculture.

Level II - Career Exploration (Grades 7-8)

This period deals entirely with the exploration of occupational opportunities in the students' interest areas. Again, there are six occupational areas within the realm of agriculture. Again, ratings

tended to be exceptionally high from all groups. Only one item, range in pay from the plant science module, received a rating of less than 4.2. All items within the remaining five modules received ratings of strongly agree.

Level III - Preparatory Period (Grades 9-12)

A summary of ratings for the secondary or preparatory period for the agricultural and agribusiness occupations service area indicated that respondents strongly agreed that all the knowledge and skill areas designated in the proposed curriculum should be taught to all persons who are planning careers in agricultural or agribusiness occupations. It must be remembered that some areas received higher ratings in both the basic instrument and the final instrument, thus greater emphasis could be put on these areas according to the students' interests or the resources of the locality.

Level IV - Post-Secondary Period (Grades 13-14)

Reactions of the respondents were very positive toward the inclusion of the outlined material in the technical training of students for agricultural or agri-related occupations. It must be remembered that these people were professionals within the educational field and not business people or farmers. Also, it should be remembered that nowhere in the questionnaire was the question of who should teach the material, only that it should be a part of the curriculum for persons planning careers in agricultural or agri-related occupations. Respondents strongly agreed that all items listed under the post-secondary or technical level should be taught. It was pointed out, in almost every case by respondents, that technical subject matter pertaining

to agricultural mechanics should not be taught as a conglomeration. It was pointed out by the respondents that a specialized course could be made up of a single item or two or more related items. Therefore, persons could choose an area and be trained specifically for that area.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

In the final analysis of the report, certain factors thought to be most significant should be brought forth. Thus, the following conclusions were drawn:

1. All groups viewed the knowledge and skill areas presented as being useful in maintaining their vocation, but at different degrees.
2. All groups viewed the knowledge and skill areas presented as being useful in maintaining their home and environment, but at different degrees.
3. This implies that the respondents considered any subject matter and/or experiences which would result in "... the student being equipped to live his life as a fulfilled human being as being useful."
4. Agribusiness personnel are predominantly trained on-the-job.
5. Students' experiences were minimal in agribusiness. This may account for the on-the-job training response by the agribusiness personnel.
6. Knowledge and skill areas relating to agribusiness are very specialized and only a talking or basic knowledge is required in related areas.
7. Agribusiness personnel's ratings tended to be somewhat lower than did other groups included in the study, while educational personnel's and farmers' ratings tended to be somewhat higher than other groups for all modules.
8. The agricultural business management module seemed to be the most useful for all groups.
9. Plant science, animal science, and soil science were most useful to farmers.

10. In the agricultural mechanics module, power mechanics and operating farm machinery were considered most important by agribusiness personnel, educational personnel, and farmers.
11. To properly implement the agribusiness, natural resources, and environmental control occupations service area in career education, staffing patterns other than those most common today in Mississippi must be utilized.
12. It was concluded that all teachers surveyed were interested in the methodology and techniques of teaching.
13. The most troublesome problem encountered in this research was the interviewees' understanding of how to develop the content and experiences on each level of education which involves all students.
14. Predominant opinions of the jury were that a core curriculum for agriculture and agribusiness for grades one through post-secondary was feasible.
15. A student preparing for education beyond the secondary level should not be trained to the extent as one who is planning to terminate his education at the secondary level.

Recommendations are as follows:

1. The proposed core curriculum should be used as a model or guide in developing a comprehensive agricultural curriculum composed of both content and experiences in Levels I, II, III, and IV.
2. The individual economic and/or community needs and resources should be evaluated to provide a basis for emphasizing certain modules or items in that particular geographical location.
3. Material (consisting of both content and experiences) should be prepared with the agricultural business management module receiving priority.
4. The model for curricular development for the secondary preparation period should be followed and material and experiences organized using this as a basis. (Transparency for Model I)
5. The model for curricular development for the agribusiness, natural resources and environmental control occupations service area in career education should be used as a guide for developing materials content and experiences for all levels of education. (Transparency for Model II)

6. The curriculum should be arranged in detailed modules for each level.
7. Future curriculum materials development activities should be designed to prepare subject matter content and/or experiences for the implementation of the core curriculum for agribusiness, natural resources and environmental control occupations on all levels of education (grades one through post-secondary).
8. In attempting to implement new concepts of staffing for agricultural and agribusiness programs, staffing patterns utilizing aides, paraprofessionals, etc., should be evaluated.
9. If need for a differentiated staff is validated, one of the three suggested staffing models, (Models III, IV, V) depending on the situation, should be utilized.
10. Experiences and/or outcomes should be developed in preparing the student for placement after completion of training.
11. Curricular content should be developed utilizing experiences with the following teaching techniques for attainment of objectives. These are: (1) programmed instruction; (2) project method, and (3) land laboratories.
12. Future research concerning core curriculums for agribusiness, natural resources, and environmental control occupations should be conducted to determine appropriate content for each module. In designing such research, it is recommended that interviewees should be carefully screened as to their competence in their occupational areas and/or choices. The project staff hypothesis is that the best approach would be job analysis.

The project staff believes that if the preceding recommendations are followed, the implementation of the agribusiness, natural resources, and environmental control occupations service area in career education could be effective and efficient.

It is also my feeling that the career education concept can hold the key to accountability, if properly planned and implemented. Accountability is the "backbone" of performance-based education. Until we can take outlines, such as we have in the proposed core for agriculture and agribusiness, and develop far-reaching, flexible content and experiences

that can be adapted to each student and his interests and environment, then I feel that career education will not work, nor will performance-based education. We must build the experiences around the student and not the student around the experiences.

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AGRICULTURAL MECHANIZATION COMPETENCIES NEEDED BY
SELECTED LOUISIANA FARMERS WITH IMPLICATIONS
FOR PROGRAM PLANNING IN ADULT EDUCATION

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Introduction

As adults, individuals can no longer depend upon experiences of daily life as their primary sources of learning. Neither can one depend solely on elementary and secondary education because new knowledge, skills, and understandings are developing so rapidly that the training of youth is often outdated soon after they graduate from school.

Technology in agriculture makes it necessary for adults to stay abreast of constant changes in mechanization. As machinery and technology become more complex, the problem of displaced individuals will increase, forcing farmers off the farm. Agricultural mechanics has always been an integral part of vocational agriculture. Needless to say, the mechanization of farming has placed additional emphasis on this phase of the program in adult education for farmers.

In the early years of vocational agriculture, mechanics in adult education was designed to teach the farmer how to perform the common repair and construction jobs which occur on the farm. Today, agricultural mechanics has evolved to include several major areas of study including: Agricultural Construction and Maintenance; Agricultural Power and Machinery; Soil and Water Management; Agricultural Structures and Environment; Electricity; and Materials and Food - Processing and Handling.

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Farming is very complex in nature. The teacher of agriculture is in a position to give counsel and guidance, acquire resource personnel and provide basic instruction in most areas of mechanization for practicing farmers.

How can teachers of vocational agriculture provide a more effective program of adult education in the farm mechanization phase of vocational agriculture? In a recent study at Louisiana State University, research was conducted to identify skills in agricultural mechanization that were felt to be important to a farming program, by selected Louisiana farmers.

The purpose of this study was to secure information to be used as a guide in formulating adult education programs in the farm mechanization phase of vocational agriculture. Responses to skills which farmers indicated to be important in their operation provided information relative to the purpose.

Distribution by Farm Type

A distribution by farm types in Table I reveals that 41 or 22.7 percent of the sample were crop farmers, 32 or 17.7 percent, dairy farmers, and 28 or 15.5 percent, livestock farmers. The remaining 80 or 44.2 percent were diversified farmers because they had no special enterprise that contributed 50 percent or more to their annual gross income.

Table I. FARMERS SURVEYED BY FARM TYPE

	Number	Percent
Crop Farmers	41	22.65
Dairy Farmers	32	17.68
Livestock Farmers	28	15.47
Diversified Farmers	80	44.20
Total (N)	181	100.00

Summary of Other Characteristics of Farmers Surveyed

1. The average age of respondents was 44 years, with a range from 19 through 66.
2. The average number of years of formal education completed was 11.5 years and ranged from 3 to more than 17.
3. The average number of years in farming was 20.7
4. The average size farm was 476.7 acres, with a range from below 50 to over 2,000 acres.
5. There was an average of two trucks and three tractors on farms.
6. Other items of a mechanized nature, found to a lesser degree, were: combines, hay balers, corn pickers, forage harvesters, electric welders and oxyacetylene units.

Data in Table II reveal that farmers will attend adult farmer classes in agricultural mechanics. The question was asked, "Would you attend an Adult Farmer Class in Agricultural Mechanics if it were offered in your local high school in the evening?" Of the 181 farmers surveyed, 145 or 80.11 percent answered in the positive and stated that they would attend an adult farmer class, if offered. The dairy

Table II. FARMERS WHO WILL ATTEND ADULT CLASSES IN AGRICULTURAL MECHANIZATION IF OFFERED

	Will Attend		Will Not Attend	
	Number	Percent	Number	Percent
Crop Farmers (CF) (N=41)	33	80.49	8	19.51
Dairy Farmers (DF) (N=32)	31	96.88	1	3.12
Livestock Farmers (FL) (N=28)	19	67.86	9	32.14
Diversified Farmers (DIV) (N=80)	62	77.50	18	22.50
Total Farmers Surveyed (N=181)	145	80.11	36	19.89

farming group was very profound in their response as indicated by 96.88 percent giving a "yes" answer to attend evening classes. The

remaining three groups replied as follows: crop farmers, 80.49; livestock farmers, 67.86 percent; and diversified farmers, 77.50 percent.

Three hundred survey forms consisting of agricultural mechanical skills in the areas of agricultural construction and maintenance; agricultural structures and environment; electricity; and materials and food-processing and handling, were mailed to 75 selected vocational agriculture teachers. Each teacher was asked to distribute the four questionnaires to four farmers in their community and to aid in their completion. The farmers were asked to indicate how valuable the 62 agricultural mechanical skills or abilities listed in the questionnaires were to their farming program. The degrees of importance from which they could choose were as follows: extremely important, 5; very important, 4; important, 3; of little importance, 2; of no importance, 1.

The mean value for the skills in each major division surveyed was revealed as follows: agricultural power units, tractors and related field machines, 4.02; agricultural electricity, 3.48; agricultural construction and maintenance, 3.45; agricultural structures and environment, 3.40; processing, handling and storage of farm materials, 3.28; soil and water management, 2.96.

All 62 skills or abilities in the survey were rated according to their mean value and placed into three levels of importance. All skills in Level I received a mean value rating of 3.50 and above. Skills and abilities in Level II received a mean score of 3.00 to 3.49 and skills in Level III were scored 2.99 and below.

Recommendations

It was realized that many agriculture teachers have evaluated their individual community needs and are aware of what should be taught in agricultural mechanization of a specific nature. The following skills are presented, however, as an aid in planning the basic curriculum in agricultural mechanics at the adult farmer plane.

Skills assigned Level I ratings by respondents should be the basis for the development of courses of study in agricultural mechanics for adults. Based upon this recommendation, the following skills should become the foundation for courses in agricultural mechanics for persons engaged in farming. Skills are grouped by mechanical areas for convenience and not as a recommendation of the order in which they should be taught. The mechanical areas are listed in order of importance, however.

I. Agricultural Power Units, Tractors, and Related Field Machines

Preventive maintenance and service on farm tractors, field equipment and stationary engines

Overhaul internal combustion engines; make repairs and replace parts, such as clutches, brakes, starters, generators, ignition points, waterpumps, etc.

Prepare machinery and equipment for storage.

Adjust farm implements under field conditions for maximum efficiency.

Keep records of maintenance and repair on machinery and equipment.

Service machinery and equipment according to operator's manual.

Operate the farm tractor and equipment safely.

II. Agricultural Electricity

Understand electrical terminology and theory of circuits.

Select proper size and type of electric wire.

Select the proper size and type of electric motors.

Evaluate wiring and rewiring for adequacy, convenience, and safety.

III. Agricultural Construction and Maintenance

Plan, equip, arrange, and manage a farm shop.

Sharpen, repair, maintain, and safely use common shop tools equipment.

Install, safely use, service, and maintain power tools (found in agricultural mechanics shops).

Select lumber, hardware and other building materials and calculate bills of material.

Construct and maintain farm buildings and equipment.

Construct and maintain adequate fences (permanent and temporary).

Recognize dangers and hazards connected with the use of tools and equipment and guard against them.

Ability to weld with the electric arc welder.

Ability to cut with an oxyacetylene torch.

IV. Agricultural Structures and Environment

Determine the building requirements for a particular farmstead.

Plan and construct farm buildings.

Estimate quantities, select suitable building materials, and compute cost in farm building construction.

Install and maintain farm water systems.

V. Processing, Handling, and Storage of Farm Materials

Recognize dangers in use of the above machinery and guard against unsafe practices.

VI. Soil and Water Management

Construct and maintain drainage system.

The following skills are Level II and should be taught after those assigned to Level I ratings have been mastered. The order in which the mechanical areas appear is listed in importance and is the recommended order in which they should be taught. The skills within each area are listed at random, however.

- I. Agricultural Power Units, Tractors, and Related Field Machines
Operate, service, maintain, and repair small gasoline engines.
- II. Agricultural Electricity
Service and maintain electric motors.
Ability to figure the cost of electricity.
Ability to plan and wire the farmstead.
- III. Agricultural Construction and Maintenance
Select hand and power tools and shop equipment, considering such factors as make, models, sizes, and grades.
Select metal for farm jobs.
Pipe and tubing work; making plumbing repairs.
Painting, applying wood preservatives of all types, spray painting.
- IV. Agricultural Structures and Environment
Remodel and rearrange existing buildings.
Evaluate construction methods and standard building materials to meet the environmental requirements of farm animals and poultry.
Install and maintain farm sewage disposal systems.
Install and maintain farm gas systems.
Ability to place concrete and do masonry jobs.
Ability to read simple blueprints.
- V. Processing, Handling, and Storage of Farm Materials
Understand the principles and application of labor-saving devices such as elevators, conveyors and associated processing and storage equipment.
Install and operate processing and handling devices such as elevators, conveyors, feed grinders, and automatic feeding equipment.
Operate and maintain grain storing, drying and handling equipment.
Evaluate storage facilities and materials handling equipment for a given farmstead.
- VI. Soil and Water Management
Maintain terraces and/or levees and contours.
Pollution control in runoff water.

Estimate cost of draining and/or irrigation systems.

Construct and maintain farm ponds and waterways.

The following skills should be considered only after activities in Levels I and II have been taught.

I. Agricultural Power Units, Tractors, and Related Field Machines

None

II. Agricultural Electricity

None

III. Agricultural Construction and Maintenance

Hot metal work, including bending, shaping, annealing, heat treating and hard-surfacing (blacksmithing).

Cold metal work, including cutting, bending, and fastening.

Sheet metal work, including cutting, bending, and fastening.

Tie the more important rope knots and hitches; make splices and halters.

IV. Agricultural Structures and Environment

Install and maintain manure disposal systems.

V. Processing, Handling and Storage of Farm Materials

Operate, adjust, and maintain grinding machines such as hammer mills, burr mills, feed mixers, etc.

VI. Soil and Water Management

Set up and use the farm level and record field notes.

Measure distances, calculate areas, do topography surveying, and read and draw topographic maps.

Construct terraces and/or levees and contours.

Plan and install a sprinkler, drip or flood irrigation system.

Develop a soil profile map.

Interpret land use maps.

Two exceptions to Level III skills are noted. If the teacher is instructing livestock farmers, the skill "Tie the more important rope knots . . ." would be more appropriately placed in Level II. Also, if a class is being held for dairy or diversified farmers, this skill would be more appropriately placed in the Level II group.

Table III. RANK ORDER OF SIX AGRICULTURAL MECHANIZATION DIVISIONS AS GIVEN BY FOUR FARMING GROUPS

	Rank Order of Groups				Average Rank
	Crop Farmers	Dairy Farmers	Livestock Farmers	Diversified Farmers	
I. Agricultural Construction and Maintenance	2nd	5th	4th	2nd	3rd
II. Agricultural Power Units, and Related Field Machines	1st	1st	1st	1st	1st
III. Soil and Water Management	6th	6th	6th	6th	6th
IV. Agricultural Electricity	3rd	2nd	2nd	3rd	2nd
V. Agricultural Structures and Environment	4th	3rd	3rd	4th	4th
VI. Processing, Handling and Storage of Farm Materials	5th	4th	5th	5th	5th

CHARACTERISTICS CONTRIBUTING TO THE SUCCESS
OF YOUNG FARMER CHAPTERS

Earl S. Webb

The purpose of this study was to identify characteristics that contributed to the successful operation of young farmer chapters in order that recommendations could be developed to enhance the performance of the young farmer program. The following specific objectives developed to accomplish this purpose were:

1. To identify selected characteristics of advisors of young farmer chapters and to determine the relationship between these characteristics and the level of performance of chapters.
2. To identify selected characteristics of young farmer members and to determine the relationship between these characteristics and the level of performance of chapters.
3. To identify selected characteristics of chapters and activities and to determine the relationship between these characteristics and the level of performance of chapters.
4. To identify procedures utilized in conducting chapter activities and to determine the relationship between these procedures and the level of performance of chapters.
5. To identify selected characteristics of local schools and communities where chapters were located and to determine the relationship between these characteristics and the level of performance of chapters.
6. To develop recommendations that could be utilized to enhance the young farmer program.

The population for this study was all young farmer chapters that had received a charter from the State Association of Young Farmers of Texas. The sample selected for study included the 138 young farmers chapters that were continuing to operate during the 1970-71 year.

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Area supervisors of vocational agriculture rated the young farmer chapters within their respective areas into three groups, according to their perception of the performance level. Thus, 44 chapters were rated at performance level I (highest rating), 44 at performance level II, and 40 at performance level III (lowest rating). Chapter ratings were utilized as the dependent variables for the study. Level II chapters were not considered in drawing conclusions relative to levels I and III chapters, however, since they served basically to broaden the distinction between characteristics of high and low performance chapters.

Data for the independent variables were collected through use of a questionnaire from the advisors of young farmer chapters selected for the sample. The independent variables consisted of characteristics of advisors, members, chapters and activities, procedures utilized in conducting chapter activities, and of the school and community where chapters were located.

Where data were of a continuous nature, the one-way analysis of variance statistical method was used to determine association at the .05 level of probability between independent and dependent variables. The chi-square test was used to determine association where only discrete data were available.

The summary of findings follows:

1. The level of performance at which young farmer chapters were rated was not significantly associated with the number of years teachers had served as advisors to young farmer chapters, the number of years they had taught vocational agriculture, nor the number of years they had taught at the school where they were located at the time of the study.

2. Neither the age of advisors nor the number of graduate hours completed were significantly associated with the level of performance at which chapters were rated.
3. Teachers of vocational agriculture who sponsored chapters that were rated at a high level of performance assigned a significantly higher level of importance to young farmer chapters than did teachers of chapters rated at a low level.
4. Members of chapters rated at a high level of performance were significantly younger than were the members of chapters rated at a low level of performance.
5. Chapters composed of a large number of members who had completed high school or one college degree were rated significantly higher than chapters composed of members who had achieved other levels of education.
6. Young farmer chapters composed of a larger number of members who were employed full-time in agricultural occupations other than production agriculture were rated significantly higher than were chapters with fewer members employed in this occupational category. No significant association was found between the level at which chapters were rated and the number of members employed as full or part-time farm operators, managers, farm workers, or the number employed in non-agricultural occupations.
7. Chapters that conducted a larger number of educational and social meetings were rated significantly higher than were chapters conducting a smaller number of such meetings. Chapters that conducted a large number of educational meetings in the subject matter areas of production agriculture, management, and agricultural mechanics were rated significantly higher than chapters conducting a smaller number of such educational meetings. The number of meetings conducted as local field days was not significantly associated with the way chapters were rated.
8. Chapters rated at a high level of performance had a significantly larger membership than did chapters rated at a low level of performance.
9. Young farmer chapters rated at a high level of performance had a significantly higher number of members in attendance at an area young farmer convention, an area field day, or the state convention, than did low performance chapters.

10. Chapters that conducted a larger number of community service activities were rated significantly higher than chapters that conducted a smaller number of such activities. The number of chapters sponsoring local awards programs was not associated with the ratings assigned young farmer chapters.
11. No significant relationship was found between the number of members visited and the ratings assigned chapters.
12. The means used to plan meetings, utilization of an advisory committee for planning the young farmer programs, and the time schedule used for planning meetings were not significantly different for chapters rated at high or low levels of performance.
13. Chapters rated at a high level of performance had a significantly higher number of meetings taught by persons other than advisors, members, or Texas Education Agency Adult Specialists, than did chapters rated at a low level.
14. Neither the method used to notify members of meetings nor the method used to recruit members was significantly associated with the level at which chapters were rated.
15. The perceived attitude of school administrators, sponsorship of a young homemaker chapter, and the number of students enrolled in vocational agriculture were not significantly different for chapters rated at high and low levels.
16. Chapters rated at a high level of performance had a significantly larger number of teachers of vocational agriculture than did chapters rated at a low level.
17. Chapters located in young farmer districts where the major source of income was agriculture were not rated significantly different from chapters located in industry or business based economies.
18. Chapters located in communities with a larger number of other agricultural and civic organizations were not rated significantly different from those located in communities with a smaller number of such organizations.

Conclusions

In so far as the sample in this study is representative of young farmer chapters, the following conclusions seem to be warranted:

1. Area supervisors of vocational agriculture can rate accurately the performance level of young farm chapters.

2. Chapters rated as being highly successful by area supervisors possess characteristics that are distinctly different from those rated as being less successful. Chapters considered to be highly successful had significantly (a) higher ratings assigned to the importance of young farmer chapters by advisors, (b) younger members, (c) more members that had completed high school and that had completed one college degree, (d) more members that were engaged in an agricultural occupation other than production agriculture, (e) larger numbers of social and educational meetings consisting of higher numbers of production agriculture, management, and agricultural mechanics meetings, (f) larger memberships, more members in attendance at area and state meetings, more community service activities, larger numbers of resource persons used for teaching young farmer classes, and (g) more teachers of vocational agriculture employed in schools.

The major hypothesis of this research, which stated that characteristic differences existed between chapters considered to be performing at a high level in achieving the purposes and goals of the State Association of Young Farmers of Texas and those performing at a low level is, therefore, supported.

Recommendations

Based on this study, the following recommendations seem appropriate for enhancing the young farmer program in Texas:

1. A concerted effort should be made through pre-service and in-service educational programs to improve the attitude of teachers of vocational agriculture toward the importance of the young farmer program in meeting the educational needs of young men in agriculture.
2. Approximately one educational meeting should be conducted monthly. The subject matter should consist of production, management, and agricultural mechanics, in accordance with the needs of the membership. Social meetings should be held occasionally throughout the year.
3. Persons employed in agricultural occupations should be encouraged to become members of young farmer chapters.
4. Members should be encouraged to attend area and state meetings.
5. Chapters should be involved in community service activities.

6. The establishment of multiple teacher departments should be encouraged so that additional time can be allocated to the educational program of young farmers.
7. Extensive use should be made of the resource persons available for teaching young farmer classes.
8. Further study should be conducted to determine effective methods for improving teacher attitude toward the young farmer program.
9. A study should be made to identify factors influencing participation in young farmer chapters.
10. Research should be conducted to determine reasons for the decline in the number of young farmer chapters in Texas.

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A STUDY OF AGRIBUSINESS MANPOWER NEEDS IN TEXAS

Larry R. Lorenz*

The Department of Agricultural Economics and Rural Sociology, Texas A&M University, in cooperation with the Division of Occupational Research and Development, Department of Occupational and Technical Education, Texas Education Agency, has begun a project to determine manpower needs in agribusiness occupations in Texas.

The project is funded by an \$89,000 grant from the Texas Education Agency and is scheduled to run through June 30, 1973. Conrad Fritsch, Assistant Professor, Department of Agricultural Economics and Rural Sociology, serves as Project Director. Dr. Earl S. Webb and Mr. John Holcomb, both Professors in the Department of Agricultural Education, are serving as co-directors for the study, providing active inter-departmental cooperation on this project. The work group, totaling 6 persons, is made up of coders and tabulators, programmers, and research associates. The educational background of these personnel includes business, economics, sociology, agricultural education, and data processing, thus allowing a rather broad variety of input to the development of methodologies and instruments.

Also assisting in the Project are Dr. H. O. Hartley, Professor and Director of the Institute of Statistics, Texas A&M University, Dr. David C. Ruesink, Professor, Department of Agricultural Economics and Rural Sociology, and Mr. J. A. Marshall, Director, Agricultural

*Dr. Larry R. Lorenz, Agricultural Education Department, Texas A&M University, College Station, Texas.

Education Division, Texas Education Agency, all of whom will serve as active consultants to the study.

The basic purpose of this study, to determine current and projected manpower needs in agribusiness occupations in Texas, stems from the fact that many occupations other than farming require the knowledge and skills that are gained through instructional programs in agricultural education, but these occupations have not been specifically identified by systematic labor market analysis. The number of persons currently employed in these occupations and the number of future employment opportunities are unknown. Comprehensive planning in agricultural education cannot be accomplished in the absence of reliable information concerning manpower requirements in these occupations.

In order to accomplish this purpose, the following objectives have been established:

1. To determine the number, kind and location of agricultural industries in Texas.
2. To determine the number, kind and geographical distribution of occupations in these industries.
3. Identification of skill requirements for occupations in these industries.
4. Identification of minimum entry requirements.
5. Identification of new areas such as natural resource development and environmental protection and the requisite skill levels required to perform in these areas.
6. Projections of future manpower and training needs by occupations for the agricultural industry.

The focus of the initial phase of this study is in the development and evaluation of alternative research methodologies following

the objectives set forth for this project. Two such methodologies have been identified:

1. Development of standardized information collecting and disseminating techniques which are applicable to agricultural and non-agricultural industries.
2. Determination of the possibilities for utilizing 1970 Census of Population data to identify and estimate the magnitude of agribusiness occupations and industries.

Under methodology one, a major effort has been concentrated toward developing a suitable information form for collecting data. A second major effort has been the securing of population lists for farm machinery sales and service dealers in Texas. The area of farm machinery sales and service will be the first area of concentration. The procedures being developed for this industry will then be applied to other agribusiness industries. These industries will include the area of ornamental horticulture as a second phase of the study and then to other occupations which are a part of the Cooperative Part-time and Pre-Employment Lab training programs offered by vocational agriculture classes in Texas. Industries studied will not necessarily be limited to this group.

The sample for this first segment of the study includes 802 farm machinery sales and service dealers in Texas. This represents all dealers in Texas handling products and services of Allis-Chalmers, Ford, David Brown, John Deere, Massey-Ferguson, Minneapolis-Moline--Oliver, and International Harvester. Names and addresses of about one-half of these dealers have been furnished; others, lists of which are not released by district offices, will be reached through the cooperation of the district offices who will address and mail the survey forms for us.

District offices have been very helpful and interested in participating in the project. They have been very willing to provide assistance in overcoming some of the logistical problems associated with contacting their respective dealers.

A tentative form of the questionnaire is being developed through a survey of related literature and similar studies conducted in other states. It is designed to provide maximum compatibility with computer data processing technology. The information form has been reviewed and revised by members of the Employment and Manpower Work Group and pre-tested with local farm machinery sales and service dealers.

The survey form asks employers to provide numbers of employees for each of several occupational categories associated with the farm machinery sales and service industry. Numbers of current employees, current vacancies, employee changes in 1971 due to business contractions or expansions, annual turnover (retirements, deaths and separations), and projected changes in numbers of employees during the next 5 years are requested for full-time, part-time, and seasonal workers. Employers are also being asked what level of training they feel is necessary to enter each of the occupational categories, whether or not technical training and/or work experience is required, and which areas of specialization within the mechanic's field have the greatest need for additional training.

Interviews have been conducted in Dallas, Texas with the various district managers of the dealers regarding their input and support of the project. They too have reviewed the proposed survey form. Their cooperation and approval for the study have been secured. Arrange-

ments have been made with those district offices to contact each of their respective dealers via the mail questionnaire.

Procedures for coding, editing, and programming the data obtained from the questionnaire are underway and a coding system for identifying the various occupational categories in the farm machinery sales and service area is also being developed. Completion of the final form of the questionnaire and mail out is expected during the next 60 days.

The utilization of 1970 Census of Population data is being investigated through direct participation with the National Committee on Employment Opportunities and Training Needs in Agribusiness. It is composed of representatives from the Office of Education - HEW, Rural Manpower Serve-Labor Department, USDA, and Bureau of the Census-Department of Commerce. This committee has appointed a task force consisting of representatives of the cooperating agencies. Mr. Fritsch is serving on this task force representing the Office of Education.

The task force under the leadership of the Bureau of the Census met in Washington, D. C. from June 12-23 to begin work on the development of an industry-occupation matrix for occupations and industries requiring agribusiness skills or competencies. The work of the task force is expected to contribute to a suggested national cross-classification and coding scheme of agribusiness occupations and industries. The cross-classification will use the coding system developed by the Bureau of the Census for the 1970 Census of Population. The codes for the industries have been developed from the Standard Industrial Classification; the codes for the occupations have been developed directly from the Dictionary of Occupational Titles. It is expected that census data

can be used to identify and estimate the employment opportunities in agribusiness at national, state, and in some cases, county levels.

It is felt that the two alternative methodologies described above are complementary in nature. While the Census of Population can provide needed bench mark data on employment opportunities, the methodologies and procedures developed under the first approach will provide more in-depth information concerning characteristics of employment opportunities, areas in which additional training is required, and a means to systematically up-date and improve labor market information.

STRATEGY FOR IMPLEMENTING
PERFORMANCE-BASED INSTRUCTION
IN TEACHER EDUCATION IN AGRICULTURE

by

Willie F. Jackson*

Mr. Chairman, Fellow Educators and Friends, I consider this opportunity a signal of honor, an honor that I shall always remember.

It appears to me, because of the evidence in the educational cycles of a growing concern and interest in performance-based education, that maybe I should comment on the activity before discussing strategy for implementation.

The topic we now focus our attention upon is not new nor is it unique to agricultural education. However, I can truly state, and I believe you will agree, that we in agricultural education have pioneered in the use of performance-based education even though the terminology might not have been used. Many of you as teacher educators have been successful in aiding teachers and prospective teachers of agriculture to make the transition from theories to practices.

If we are optimistic, we will probably say that much has been done in performance-based teacher education in the last five years. If we have the inclination to emphasize adverse aspects or possibilities, we may say like Mark Twain said about the weather, "Everybody is talking about it but nobody is doing anything about it." The committee on

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performance-based teacher education under the auspices of AACTE regards performance-based teacher education as being a new approach to teacher education. It further noted that through the use of this approach, teacher education will involve much closer collaboration with other institutions and groups. I firmly believe that we in agricultural education are also pioneers in the use of these aspects.

For some time now, all of us have been cognitive of what Calvin T. Lee calls a gap between the theory of learning and practices in teacher education. My task here is to briefly discuss the strategy of implementing the type of instruction that bridges this existing gap.

Being an old combat veteran, strategy to me just may take on a different meaning. In fact, I get a feeling of a high echelon setting up structure for the lower echelon to successfully execute with the end results being victory. Whatever the case may be, I am elated to have the opportunity to discuss the strategy of implementation of instruction with such a knowledgeable and experienced group. However, I do not have an outlined procedure for getting over performance-based instruction to teacher education.

In view of the acknowledgement above, for the remainder of this presentation, I shall not discuss very much strategy inasmuch as I shall discuss those things which I believe will influence and affect strategy in implementing performance-based instruction. I believe communication, interpretation, teacher accountability, existing conditions and teacher education programs to be significant in implementing performance-based instruction in teacher education. If performance-based instruction is to have the desired affect on the total program that we envision, there

must be continuous and effective communication between teacher educators, administrators, students and the general public. The teacher educator must keep before him all concerned group changes, anticipated changes and expected outcome of the new approaches in teacher education. Teacher and instruction accountability are also necessary to create and sustain conditions that may lead to the changing of accreditation laws and move implied standards and dogma from the minds of those who control the very destiny of teacher education.

Federal money has become available for a variety of programs, including exploratory and experimental programs in performance-based instruction in teacher education. Technological development has made available new resources in teaching and learning. In some cases business and industry have paralleled the regular education system in preparing people to enter the world of work. The regular education system has encountered some rebellion from small ethnic groups. The taxpayers are constantly placing demands on all levels of education. Youth have pressed for greater relevance in education and a voice in determining what its goals should be. Some educational systems have removed a portion of their teaching programs from the regular system and contracted with industry on a guarantee based upon performance. Various groups from all levels and segments of society are pressing for a share in the decision making power and goal determination in education. In fact, people are concerned about all phases of education with attitudes ranging from positive to hostile. These existing conditions give rise to an accelerated rate of change in teacher education but sometimes keep it in a foggy atmosphere.

To cope with these existing conditions and circumstances, I am of the opinion that programs for performance-based instruction must be highly flexible and almost endless. They must include many provisions almost systemless. Programs must provide for a distinct curriculum for every trainee in teacher education. They must encompass alternatives with built-in evaluation criteria for performance and practical processes. They must provide for and allow for each competence and for each level of competence that are needed by prospective teachers of agriculture.

I am confident that many of the existing program components in teacher education are highly ample to perform this task with some provision. When I speak of program component I mean apprentice teaching, teacher intern, college work experience and education program, college cooperative education program, model programs at institutions and out-reach programs. Personally, I don't see any of these components that we have used in teacher education being deleted. Rather than delete, they should be revised by setting performance objectives, performance criteria and by determining what is a unit of practice in the various disciplines. Credits should be assigned based on the quality and quantity of practice. We should continue to use those program components that have made teachers of agriculture successful in their professions.

Because of accreditation laws, traditions, standards, and dogma in education, we have not determined valid and reliable measures of performance in the many categories that we may use in training our students.

It is obvious that no single program component can prove adequate to service the needs of various persons in any institution. The fact that students enter the institution with different kinds and levels of academic preparation with varying types and degrees of experiences, with divergent maturity and motivation connotes that they enter teacher education this way. Many times more than one program component will be used with one trainee to implement performance-based instruction. Each trainee can move through those program components at a pace limited only by his motivation and ability to reach the required levels of competency which have been specified in the program component and understood by the trainee.

It seems that the crux of the matter of implementing performance-based education lies in some acceptable means of determining a unit of practice. Followed by this, and in a distant second place, is the number of practice hours to reach training objectives in all instructional areas in agricultural education.

The subject under discussion is unlike Mark Twain said about the weather; much is being said and much is being done. Articles have been written in many periodicals and some institutions have reported outstanding accomplishments in performance-based education. I shall read a few excerpts from some articles:

- (1) The committee on performance-based teacher education under

AATEA states, "Performance-based teacher education is considered by some authorities to be superior to traditional strategies for developing the teacher's knowledge, skills and attitudes necessary to facilitate student learning."

- (2) Richard H. Wilson, Performance Criteria for Agricultural Instruction, Agricultural Education, Vol. 41, May 1969, p. 261.
- "In a corollary effect toward occupational realism, we need to establish performance criteria for instruction and describe students in terms of performance capability."
- (3) Richard and Stewart, Using Performance Objective in Instructional Materials, Agricultural Education, Vol. 44, Sept. 1971, p. 77.
- "Performance objectives are recognized as being only a step in the instructional system but a step which provides for focusing learning upon the student and a step which can lead to evaluation."
- (4) Dr. Byran, Standard of Performance, Agricultural Education Magazine, Vol. 44, August, 1971, p. 32. "We know how to provide for practice as a part of instruction. . . The approved practice of guiding the learning to students in relevant work experiences are known."
- (5) Johnson and Peer, A Pass-Fail System With Option For the Learner, American Vocational Journal, Sept. 1969. "The greatest promise of a program based on performance lies in its capacity for liberating us from rigidly defined points of entry and exit."
- (6) Freddie C. Neff, Competency-Based Teaching and Trained Fleas, Phi Delta Kappan, April, 1972. "Trained competency-based performers in our school and the trained fleas in the circus have more in common than you might at first suppose."

May I further call your attention to work experience and education program used in New York state where work experience in all academic areas of agriculture is required. A student must earn 13 units of

practice credit before he qualified to register as a senior for a Bachelor of Science Degree. To each one unit of practice credit a full week of work is performed satisfactorily in an acceptable work situation and a report submitted as evidence that work has been performed. In agricultural education, the work experience can be on the farm or in his respective profession or a combination of the two.

I have only presented the above and I will not evaluate. However, when I think of the instructional areas and the areas of preparation in agricultural education which are to benefit from performance-based instruction in agricultural education, there lies ahead a difficult job and challenge.

Therefore, I believe that teacher educators in agriculture will be the pioneers in determining valid and reliable ways to measure the skills and competencies required in performance-based instruction. These ways determined by our pioneer teacher educators will be acceptable to boards of education, administrators, teachers, students, and the general public because open channels of communications have been in the determination and freedom of participation for all.

THE RELATIONSHIP OF SELECTED VARIABLES TO THE
SUPERVISION PROVIDED STUDENTS OF
VOCATIONAL AGRICULTURE BY
THEIR TEACHERS

Charles W. Byers*

The purposes of this study were: 1) to determine the relationship between selected variables and the quantity of supervision (as measured by the number of supervisory visits) provided students of vocational agriculture by their teachers and 2) to determine the relationship between selected variables and the quality of supervision (as measured by the students' rating of teacher performance on supervisory visits) provided students of vocational agriculture by their teachers. The selected variables were: 1) number of vocational agriculture teachers in the department, 2) hours taught each day, 3) hours available for supervision during the school day, 4) number of students in all classes, 5) number of class sessions taught adults during the year, 6) number of days adults were supervised, 7) farms per teacher in the county having above \$2,500 gross sales, 8) age of the teacher, 9) years of teaching experience, 10) hours per week spent in church, professional, and community activities, 11) size of the teacher's family, 12) hours the teacher's wife works away from home, 13) number of college courses enrolled in during the year, 14) hours of college work completed above the BS Degree, 15) hours employed per week other than teaching, 16) number of students with experience programs at school only, 17) hours of student labor on experience programs, 18) whether or not students

*Dr. Charles W. Byers, Assistant Professor, Agricultural Education Department, University of Kentucky, Lexington, Kentucky.

have written plans on experience programs, 19) amount of investment by students in experience programs, 20) amount of profit by students from experience programs, 21) evaluation of the class instruction by students, 22) attitude of parents toward experience programs, 23) grade completed by students, 24) years of agriculture completed by students, and 25) percent of students having farming programs.

Data were collected from Kentucky teachers of vocational agriculture and their students. Random samples of 85 teachers of vocational agriculture and 914 of their students were taken. A usable response was received from 725 students, or 79.3 percent. Mail questionnaires were used to collect the data from teachers and students. Stepwise regression was used in analyzing the data.

There was a significant correlation between six of the variables studied and the quantity of supervision which students of vocational agriculture are provided by their teachers. The significant variables and the appropriate conclusions were: 1) the more hours of labor students spend on their experience programs, the greater the probability that students will be provided supervision by their teacher, 2) the larger the investment by students in their experience programs, the greater the probability that students will be provided supervision by their teachers, 3) the higher students evaluate the value of the class instruction, the greater the probability that students will be provided supervision by their teachers, 4) the better the attitude of parents toward experience programs, the greater the probability that students will be provided supervision by their teachers, 5) the more students the teacher of agriculture has in all classes, the less likely students are

to be provided supervision by their teacher, and 6) the more farms per teacher in the county having above \$2,500 gross sales, the less likely students are to be provided supervision by their teachers.

There was a significant correlation between four of the variables studied and the quality of supervision which students of vocational agriculture are provided by their teachers. The significant variables and the appropriate conclusions were: 1) the more class sessions taught adults, the greater the probability that students will be provided quality supervision by their teachers, 2) the higher students evaluate the value of the class instruction, the greater the probability that students will be provided quality supervision, 3) the better the attitude of parents toward experience programs, the greater the probability that students will be provided quality supervision by their teachers, 4) the more hours the teacher's wife works away from home, the less likely students are to be provided quality supervision by their teachers.

A STUDY OF TEACHER DEMAND AND SUPPLY IN THE SOUTHEASTERN REGION

David G. Craig*

Background

1. An interest was expressed for a regional study at the Clemson Conference in 1971.
2. Charlie Curtis appointed a committee to study and report at the 1972 conference.
3. The committee met at Atlanta in March 1972. In terms of present need, it decided to plan a study concerning teacher demand and supply.

Situation

1. For the year 1970-71, the Southern Region prepared the largest number of teachers with 822.
2. Of this number, 46.5 percent became employed as teachers of vocational agriculture.
3. Seven states in the region had 16 or more agricultural education graduates employed in positions other than teaching vocational agriculture.
4. Even though 362 new and replacement teachers were employed up to August 1, 1971, there was an additional need for 53 persons to teach in nine states.
5. The estimated number of teachers needed by 1975, over the 1971 figure, was 625.

Problem

What procedures can be identified to balance the demand and supply of teachers in the southeastern states.

Questions

The following questions should provide answers and alternative solutions to the problem.

1. How many teachers were certified in vocational agriculture during the past eight years?

* Dr. David G. Craig, Associate Professor, Department of Agricultural Education, University of Tennessee, Knoxville, Tennessee.

2. How many were placed in vocational griculture teaching positions?
In-state? Out-of-state?
3. How many additional teachers will be needed in 1972? 1975?
1978?
4. What types of teaching positions exist in vocational agriculture?
by kind of school and students? size of staff? kind of program?
5. How have certification standards been changed to attract poten-
tial teachers from specialized agricultural college areas?
agricultural business and industry?
6. What procedures are being used to recruit potential vocational
agriculture teachers? Which ones are most effective?
7. What efforts have been made to recruit across state lines?
8. How many teachers of vocational agriculture are uncertified
in the states?
9. What placement procedures are being used to increase the holding
power of present teachers?
10. What placement procedures are used?

Procedure

1. The study will be planned, implemented, and summarized
jointly by five professors in five states of the southern
region.
2. From a review of the literature and a detailed analysis of the
needed data, a questionnaire will be developed. It will be
field tested with five randomly selected institutions (those
to be used again later in the study).
3. Mail and receive questionnaires during the fall term, 1972.
Follow-up letters will be used to achieve 100 percent return.
4. Tabulate and summarize data.
5. Publish and circulate completed study.

Limitations of the Study

1. Thirteen states in the Southern Region.
2. Vocational agriculture education.
3. Four-year institutions preparing teachers of vocational
agriculture education.

Implications

1. Further study in depth regarding recruitment and retention of teachers.
2. Replication in other U. S. regions.
3. Continue study from year to year.

APPENDICES

APPENDIX A

PROGRAM

PROGRAM

Meeting Place: Conference Room, Alumni House

Tuesday, July 25

10:00 - 11:45 a.m. Registration

First Session Chairman — James E. Wall, Asst. Dean (R&D)
College of Education, Mississippi State University

1:30 p.m. Welcome — W. K. Porter, Jr., Associate Director
Agricultural Experiment Station, Mississippi State University

1:50 Introduction and Plans for the Conference —
James F. Shill, Co-Director, Research Coordinating
Unit, Mississippi State University

2:00 Report of Research in the Region — Conference
Participants

3:30 Coffee Break

4:00 Proposal for Teacher Supply and Demand Research
Project in the Southern Region — David Craig,
Associate Professor, University of Tennessee, Chair-
man of Research Study Committee appointed at
1971 conference

4:45 Discussion

5:15 Adjournment

Wednesday, July 26

Second Session Chairman — Charles E. Lindley, Dean, College of
Agriculture, Mississippi State University

9:00 a.m. *Performance-Based Teacher Education in Prospective* — O. L. Snowden, Professor and Head, Department of Agricultural Education, Mississippi State University

9:30 *Utilizing Agricultural Industry In Determining Performance Objectives* — S. D. Patterson, Assistant Professor, University of Florida

10:15 Questions and Discussion

10:30 Coffee Break

11:00 *Career Development Programs for Agricultural Occupations* — Floyd J. Lark, Graduate Assistant, Oklahoma State University

11:45 Questions and Discussion

12:00 Lunch

**Third Session Chairman — J. H. McMinn, Coordinator, Research,
Curricula and Teacher Education, Mississippi Depart-
ment of Education**

- 1:30 p.m. *Developing A System For Assessing Student Per-
formance in Agricultural Education* — Glenn C. Shinn
Assistant Professor, University of Florida
- 2:15 Questions and Discussion
- 2:30 *Relationship of Variables to Supervision of Students*
Charles Byers, Assistant Professor, University of
Kentucky
- 3:00 Questions and Discussion
- 3:15 Coffee Break
- 3:30 *Implications of a Core Curriculum for Agriculture
on Performance-Based Teacher Education* — R. Glenn
Shoemaker, Research Associate, Mississippi State
University
- 4:15 Questions and Discussion
- 4:30 *Agricultural Mechanization Competencies Needed
by Farmers with Implications for Program Planning*
C. M. Curtis, Professor, Louisiana State University
- 5:00 Questions and Discussion
- 5:15 Adjournment

Thursday, July 27

**Fourth Session Chairman — Merrill M. Hawkins, Dean, College
of Education, Mississippi State University**

- 9:00 a.m. *Young Farmer Program Research in Texas* — Earl S.
Webb, Professor, Texas A&M University
- 9:45 *Agri-Business Research in Texas* — Larry Lorenz,
Texas A&M University
- 10:15 Coffee Break
- 10:45 *Implementing Performance-Based Teacher Educa-
tion Programs* — Willie F. Jackson, Professor and
Head, Agricultural Education Department, Alcorn
A&M College
- 11:05 Summary of Conference — V. S. Eaddy, Assistant
Professor, Auburn University
- 11:30 Business Meeting — C. M. Curtis, Professor, Louisiana
State University
- 12:00 Adjournment

APPENDIX B

CONFERENCE PARTICIPANTS

SOUTHERN REGION RESEARCH CONFERENCE IN AGRICULTURAL EDUCATION

<u>NAME</u>	<u>INSTITUTION</u>
Charles Byers	University of Kentucky
David G. Craig	University of Tennessee
Charlie M. Curtis	Louisiana State University
Vanik S. Eaddy	Auburn University
Tom Ellis	Miss. State Dept. of Education
J. R. Hamilton	Mississippi State University
J. Alex Hash	Clemson University
Lloyd P. Jacks	Murray State University
W. F. Jackson	Alcorn A & M College
Jay Lark	Oklahoma State University
Jasper S. Lee	Mississippi State University
Larry Lorenz	Texas A & M University
Lamar Love	University of Arkansas
J. H. McMinn	Miss. State Dept. of Education
S. Douglas Patterson	University of Florida
James F. Shill	Mississippi State University
Glen C. Shinn	University of Florida
R. Glenn Shoemake	Mississippi State University
Obed S. Snowden	Mississippi State University
Ed L. Thomas	Mississippi State University
George Walker	Mississippi State University
Earl S. Webb	Texas A & M University